PARTICULATE MATTER AND OZONE MANAGEMENT FACT SHEET

Issued May 2009

What is $PM_{2.5}$?

Particulate matter can be emitted by any combustion source.

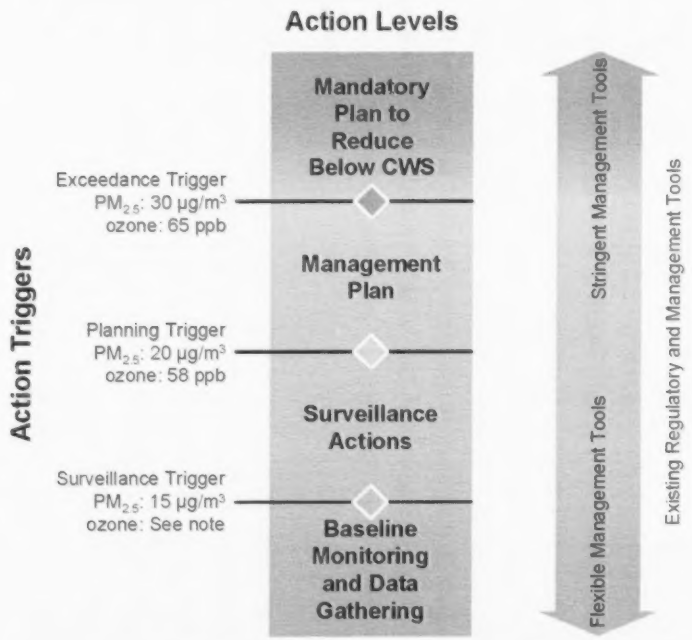
$PM_{2.5}$ is fine particulate matter less than 2.5 micrometers in diameter. In comparison, a human hair is about 70 micrometers in diameter. These fine particles are small enough to penetrate the lungs and can be a human health concern, depending on their composition. Fine particulate matter can be emitted by any combustion source including automobiles, industrial and wood burning. Smoke from forest fires and other types of burning are a major source of $PM_{2.5}$.

What is Ozone?

Ozone is a major component of smog.

Ozone is a major component of summer-time smog and is produced by several atmospheric processes. During hot weather conditions, emissions of chemicals from automobiles, industry and other non-natural sources can lead to high ozone levels, especially near urban areas. In the spring and summer seasons, ozone is at high levels because of natural ozone forming processes. Ozone can be transported down to the surface from the "ozone rich" upper atmosphere. It can also be produced during warm weather conditions due to chemical reactions involving organic compounds emitted by vegetation.

Figure 1 Alberta's particulate matter and ozone management framework.
Extracted from CASA Particulate Matter and Ozone Management Framework (September 2003).



Note: For ozone, AENV will determine on an annual basis which areas are in baseline and which areas are in surveillance

ISBN:
978-0-7785-8511-4 (Printed) 978-0-7785-8512-1 (On-line)

Particulate Matter and Ozone Management

What is the CASA Particulate Matter and Ozone Management Framework?

Alberta is committed to achieving Canada-wide Standard levels for particulate matter and ozone by 2010.

The *CASA (Clean Air Strategic Alliance) Particulate Matter and Ozone Management Framework* is Alberta's commitment to achieve Canada-wide Standard levels by the 2010 target date. Three action triggers and four action levels (described below) were established under the Framework (see Figure 1).

How does the Particulate Matter and Ozone Management Framework work?

The data from 2005 to 2007 indicate that Alberta did not exceed the Canada-wide Standards for particulate matter and ozone.

- **When ambient air levels are above the Canada-wide Standard exceedance trigger there will be a mandatory plan to reduce them.**

  Alberta Environment will develop and implement a management plan containing measures to reduce ambient concentrations to below the numeric CWS within two years, working with stakeholders where possible.

- **When ambient air levels are above the planning trigger and below the Canada-wide Standard exceedance trigger there will be a management plan.**

  A management plan will be developed and implemented by stakeholders with appropriate actions that consider factors such as: (1) trends in population growth and industrial activity, (2) trends in ambient air quality, and (3) ambient concentration relative to the planning trigger. The goal of the management plan level is to prevent a future exceedance of the CWS and to maintain or improve air quality. Alberta Environment may impose a plan if stakeholders do not develop a plan within two years.

- **When ambient air levels are above the surveillance trigger and below planning trigger there will be surveillance actions.**

  Alberta Environment, with support from the airshed zones, should take steps to ensure that sources of elevated concentrations are determined and that trends in ambient concentrations are monitored and analyzed.

- **When ambient air levels are below the surveillance trigger there will be baseline monitoring and data gathering.**

  Alberta Environment or airshed zones should conduct ongoing monitoring of ambient air quality. No additional data analysis is required.

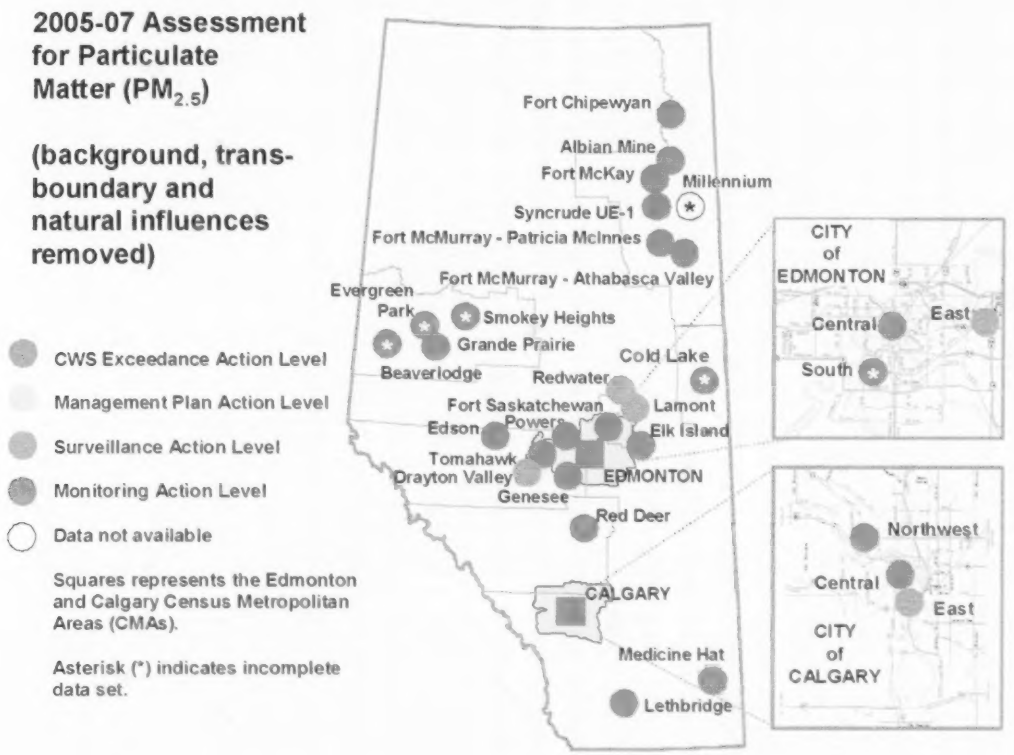
What are the results of the current air quality assessment?

Alberta Environment has completed the assessment of particulate matter and ozone data collected at Alberta monitoring stations from 2005 to 2007. Action levels have been assigned to individual monitoring stations and to the Edmonton and Calgary Census Metropolitan Areas. This was done following the protocols and procedures defined by the CASA Framework and the Canada-wide Standards.

This assessment includes backing out, or removing, episodes that were caused by natural, background or trans-boundary influences. These results are presented in Figures 2 and 3 and are summarized as follows:

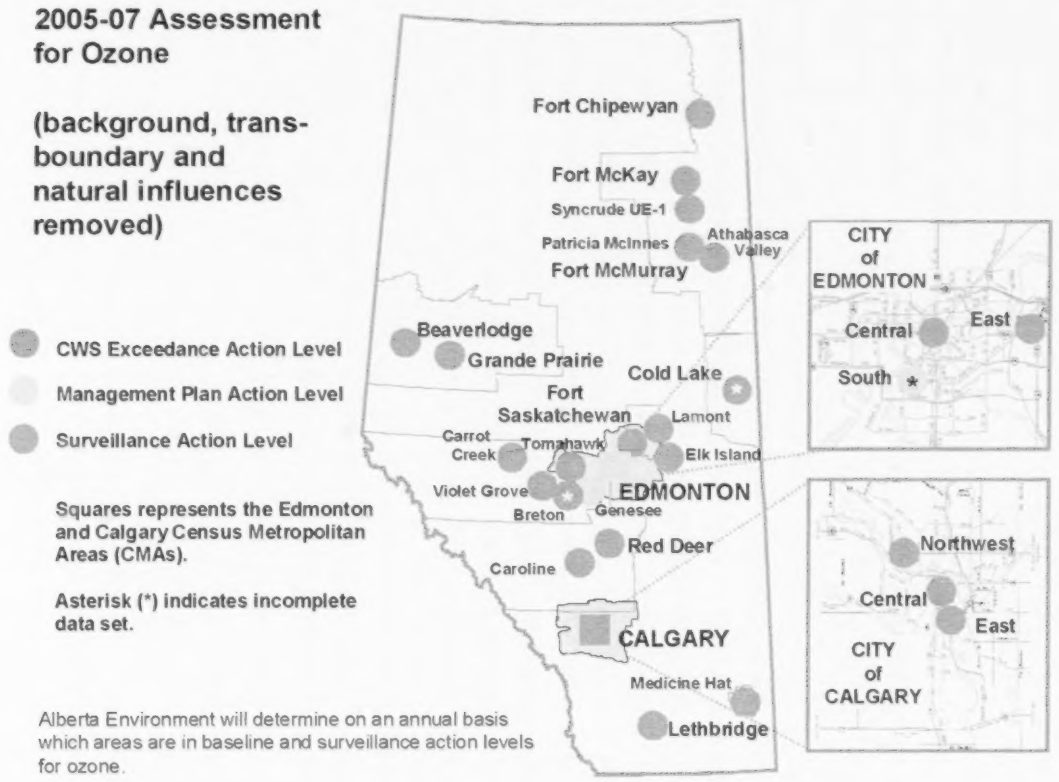
- The Canada-wide Standards were not exceeded for ozone or particulate matter in Alberta based on data from 2005 to 2007.
- The planning trigger for ozone was exceeded in the Edmonton Census Metropolitan Area and the West Central airshed. Note that portions of the West Central airshed are located within the boundaries of the Edmonton Census Metropolitan Area. The planning trigger for particulate matter was not exceeded over the 2005 to 2007 period.
- Final action levels for both $PM_{2.5}$ and ozone lowered or remained consistent at most Alberta stations from the 2001-2003 to the 2005-2007 assessments.

Figure 2 Action levels for particulate matter ($PM_{2.5}$) based on 2005 to 2007 data.



- The Edmonton and West Central areas, along with the Fort Saskatchewan, Red Deer and Calgary areas were assigned to the Management Plan action level for ozone based on the 2001 to 2003 assessment. Stakeholders in these areas have developed air quality management plans and submitted them to Alberta Environment in December of 2008. The goal of the plans is to prevent future exceedances of the CWS trigger. These plans will be continually reviewed and updated as conditions change in the respective areas. No new areas were assigned to the Management Plan action level for ozone or particulate matter over 2005 to 2007.

Figure 3 Action levels for ozone based on 2005 to 2007 data.



Through the CASA Framework, stakeholders develop collaborative management plans to prevent exceedances of the Canada-wide Standard level.

Management plans may range from compulsory to voluntary actions.

Ambient air quality levels of particulate matter and ozone are below Canada-wide Standard levels in all areas of the province. However, keeping with the principles of *keeping clean areas clean*, *pollution prevention* and *continuous improvement*, the Canada-wide Standard levels are not "pollute up to" levels. This is the reason that more stringent action levels have been established through the CASA Framework. These action levels allow stakeholders to develop management plans containing preventive measures aimed at avoiding future exceedances of Canada-wide Standard levels.

The management plans are developed through a collaborative process rather than being imposed on stakeholders through a regulatory framework. The plans themselves, however, may be implemented through a wide variety of regulatory and non-regulatory mechanisms. The intent of the CASA Framework is to develop and implement management actions through a process that will facilitate multi-stakeholder responsibility for air quality management. The management plan may range from compulsory actions such as regulations and bylaws to voluntary actions such as providing incentives for use of environmentally responsible modes of transportation. Management actions can be implemented by a variety of organizations including government (federal, provincial or municipal), the private sector and non-government environmental associations.

What are the Canada-wide Standards?

The Canada-wide Standards strike a balance between achieving the best environmental protection possible and the cost of reducing emissions.

The Canadian Council of Ministers of the Environment established Canada-wide Standards for $PM_{2.5}$ and ozone in June 2000. These Standards are based on the principles of *continuous improvement*, *pollution prevention* and *keeping-clean-areas-clean*.

The Canada-wide Standards are an important step towards the long-term goal of minimizing the risks of particulate matter and ozone on human health and the environment. They represent a balance between achieving the best health and environmental protection possible and the feasibility and costs of reducing the pollutant emissions that contribute to particulate matter and ground-level ozone in ambient air.

Each province produces comprehensive reports on the standards every five years, beginning in 2006. Annual reports on achievement and maintenance of the standards will begin in 2011. Provincial implementation plans will outline more comprehensive actions to achieve the standards by the 2010 target date. The *CASA (Clean Air Strategic Alliance) Particulate and Ozone Management Framework* is Alberta's jurisdictional implementation plan.

The Canada-wide Standards are based on the following calculation metrics:

$PM_{2.5}$	*30 µg/m³ (micrograms per cubic meter), averaged over 24 hours, by year 2010. Achievement to be based on the 98th percentile ambient measurement annually, averaged over 3 consecutive years*
Ozone	*65 parts per billion (ppb), 8-hour averaging time, by 2010. Achievement to be based on the 4th highest measurement annually averaged over 3 consecutive years.*

For more information on Alberta's Particulate Matter and Ozone Management Framework, contact:

Alberta Environment
Air Policy and Environmental Health Section at:
Phone: (780) 644-6999
Fax: (780) 644-8946

More information on Particulate Matter and Ozone Management is available online at www.environment.alberta.ca/1970.html